CLAIMS

[1] An ultrasonic urinary volume sensor comprising:

a probe having a plurality of ultrasonic oscillators for oscillating ultrasonic waves toward a wall surface of a bladder, which is adhesively placed over a body surface in an abdominal section via an ultrasonic wave transmission medium interposed therebetween; and

a processing section for detecting and processing reflective echoes of the ultrasonic waves from said wall surface of the bladder, which have been oscillated by said plurality of ultrasonic oscillators of said probe, wherein

said plurality of ultrasonic oscillators is disposed along a direction of expansion of the bladder.

[2] An ultrasonic urinary volume sensor in accordance with claim 1, in which

said probe is adhesively placed over the body surface in the abdominal section such that a lower end of said probe is aligned with an upper end of the pubic bone.

[3] An ultrasonic urinary volume sensor in accordance with claim 1 or 2, in which

said probe is adapted to be adhesively placed over the body surface in the abdominal section via said supersonic transmission medium not only occasionally for a measurement but also for all the time.

[4] An ultrasonic urinary volume sensor in accordance with any one of claim 1 to 3, in which said processing section

detects an ultrasonic wave echo peak (P) of a

posterior wall of the bladder from the reflective echoes of the ultrasonic waves from the wall surface of the bladder, which have been oscillated by each one of said plurality of ultrasonic oscillators;

executes a multiplication of the detected ultrasonic wave echo peak (p) by a distance between an anterior wall and the posterior wall of the bladder (D) that can be specified from said ultrasonic wave echo peak (P) for each one of said plurality of ultrasonic oscillators;

executes an addition of respective values from the multiplications to determine a measured indicator value (PD); and

executes a multiplication of said measured indicator value (PD) by a coefficient corresponding to a difference among individuals based on their anatomical structures and a specific posture during the measurement to thereby estimate the urinary volume in the bladder reliably.

[5] An ultrasonic urinary volume sensor in accordance with claim 4, in which

said processing section comprises a hardware section and a CPU section, wherein

said hardware section is electrically connected to said plurality of ultrasonic oscillators of said probe and said CPU section, and includes a low noise amplifier, an A/D converting circuit, a waveform memory, a timing generating circuit and an ultrasonic oscillator exciting circuit.

[6] An ultrasonic urinary volume sensor in accordance

with claim 5, in which

said CPU section comprises a real-time clock for outputting a signal at each predetermined timing, and said CPU section controls said hardware section in response to said signal output from said real-time clock.

[7] An ultrasonic urinary volume sensor in accordance with claim 5, in which

said CPU section comprises a gain control section for controlling a gain of said low noise amplifier, and an amplification factor for said low noise amplifier is automatically controlled by said gain control section.

[8] An ultrasonic urinary volume sensor in accordance with claim 5, further comprising,

a detachable storage medium, wherein

said CPU section is electrically connected to said storage medium.

[9] An ultrasonic urinary volume sensor in accordance with claim 5, further comprising,

a wireless data communication function, wherein

said CPU section is electrically connected to said wireless data communication function.

[10] An ultrasonic urinary volume sensor in accordance with claim 5, in which

said probe comprises a triaxial acceleration sensor.